

Form No. A

Certificate from ECBC Expert / Design Professional to be enclosed with the application for Building Permit for ECBC Compliant Building Certificate

I am ECBC Expert / Design Professional having registration no. /_____ under the Energy Conservation Act 2001 and am/are authorized to scrutinize and verify the design of ECBC Compliant Building. I certify that –

- (a) I have scrutinized the construction documents duly signed by the owner / Architect showing all the pertinent data and features of the building, equipment and systems in sufficient details covering Building Envelop, HVAC, Service hot water, Lighting and Electrical power in accordance with Punjab ECBC in respect of building proposed to be constructed on plot on _____ block no. _____ Scheme in the city of _____ in the State of _____; (Annexure 1)
- (b) I have scrutinized the compliance forms together with the checklists (Annexure-2) to ensure compliance with the Punjab ECBC.
- (c) ECBC Compliance Report incorporating the proposed energy conservation measures have been duly checked and verified by the undersigned. The Energy Performance Index Ratio of the building design as per construction documents at the design stage are equal to or less than one and are therefore in compliance with the Punjab ECBC (Annexure 3).
- (e) It is certified that all the required scrutiny and verification of the documents submitted have been carried out diligently and truthfully and all reasonable professional skill, care and diligence have been taken in scrutinizing and verifying the drawings of the buildings and compliance forms together with checklists covering the various components of the Punjab ECBC. This complies with the requirements of Punjab ECBC and supporting data is attached. (Annexure 5)
- (f) The contents of all the documents submitted along with the application are a true representation of the facts and nothing has been concealed.

There is no objection for issue of Building Permit in respect of the aforesaid proposed Building in so far as requirements of Punjab ECBC are concerned.

Date

Signature
Building Owner/Applicant

Signature
Name of the ECBC Expert / Design Professional
Registration no. with SEAL

Enclosures:

- Annexure-1 – Building Details Proforma
- Annexure-2 – Punjab ECBC Compliance Forms (Summary + Checklists)
- Annexure-3 – ECBC Compliance Report at design stage (including Simulation report, if applicable)
- Annexure-4 – Certificate of BEE Empanelled ECBC Expert/Design Professional
- Annexure-5 – Project Data for all applicable systems

PROJECT DATA REQUIREMENTS FOR PUNJAB ECBC

Following are the list of documents required for the compliance of Punjab ECBC at design stage:

S.No.	Project Requirements	Annexure
<input type="checkbox"/>	Building Details Proforma (Form-1)	Annexure- 1
<input type="checkbox"/>	ECBC Compliance Forms (including Summary & Checklist) (Forms 2-10)	Annexure- 2
<input type="checkbox"/>	ECBC Compliance Report (including Whole Building Energy Simulation report, if applicable)	Annexure-3
<input type="checkbox"/>	Certificate of BEE Empaneled ECBC Expert/Design Professionals or BEE Certified ECBC Master Trainers	Annexure-4
<input type="checkbox"/>	Project Data Requirements for all 5 Building Applicable Systems (Building Envelope, HVAC, Lighting, Service Hot Water and Electrical Systems) (Form 11-14)	Annexure-5

Form 1- Building Details Proforma

S. No.	Description	Project Details
1	Name of Building	
2	Location with Address	
3	Building Type (Hotel/Mall/Hospital/Building Complex/Retail/IT/Office)	
4	Project Type (New Building/Addition/Alteration/ Change of Use)	
5	Building Area	Plot Area (sq. ft.) -
		Built-up Area (sq. ft.) -
6	No. of Floors in Building	
7	Owner's Details	Name of Owner -
		Owner's Address -
		Owner's Contact Number -
		Owner's Email Id -
8	Architect Details	Name of Architect -
		Architect Address -
		Architect Contact Number -
		Architect Email Id -
9	Project Comes Under (Corporation/Council/Committee/ Authority/Nagar Panchayat) with Address	Name -
		Address -
10	Any other Information related to the building	
11	Name & Contact Number of the Nodal Officer In-charge	

Signature of the Applicant

Punjab ECBC Compliance Forms

Form 2 - Envelope Summary

Envelop Summary
The Punjab Energy Conservation Code Compliance Forms

Project Info	Project Address		Date	
			For Building Department Use	
	Applicant Name			
	Applicant Address			
	Applicant Phone			
Project Description	<input type="checkbox"/> New Building	<input type="checkbox"/> Addition	<input type="checkbox"/> Alteration	<input type="checkbox"/> Change of Use

Compliance option	<input type="checkbox"/> Prescriptive	<input type="checkbox"/> Envelope Trade off (Appendix D)	<input type="checkbox"/> Whole Building
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	<input type="checkbox"/> Hospital, hotel, call center (24 hour)		<input type="checkbox"/> Other building types (daytime)		
Vertical Fenestration Area Calculations	Total Vertical Fenestration Area (rough opening)	divided by	Gross exterior wall area	times 100 equals	%vertical fenestration
		÷		×100	
Skylight Area Calculation	Total Skylight Area (rough opening)	divided by	Gross exterior wall area	times 100 equals	%vertical fenestration
		÷		×100	

Note: Vertical fenestration area cannot exceed 40% of the gross wall area for prescriptive option

Note: Skylight area cannot exceed 5% of the gross roof area for prescriptive compliance

Hospital, hotel, call center (24 hour)		
OPAQUE ASSEMBLY		
<i>Roof</i>	Minimum Insulation R-value	
<i>Wall</i>	Minimum Insulation R-value	
FENESTRATION		
<i>Vertical</i>		
	Maximum U-factor	
	Maximum SHGC (or SC)	
<i>Overhang (yes or no)</i>		
	If yes, enter Projection Factor	
<i>Side fins (yes or no)</i>		
	If yes, enter Projection Factor	
<i>Skylight</i>		
	Maximum U-factor	
	Maximum SHGC (or SC)	

Other building type (daytime)		
OPAQUE ASSEMBLY		
<i>Roof</i>	Minimum Insulation R-value	
<i>Wall</i>	Minimum Insulation R-value	
FENESTRATION		
<i>Vertical</i>		
	Maximum U-factor	
	Maximum SHGC (or SC)	
<i>Overhang (yes or no)</i>		
	If yes, enter Projection Factor	
<i>Side fins (yes or no)</i>		
	If yes, enter Projection Factor	
<i>Skylight</i>		
	Maximum U-factor	
	Maximum SHGC (or SC)	

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Form 3 - Building Permit Plans Checklist

Building Permit Plans Checklist The Punjab Energy Conservation Code Compliance Forms	Envelop Checklist
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Project Address			Date			
The following information is necessary to check a building permit application for compliance with the building envelop requirements in The Punjab Energy Conservation Building Code.						
Applicability (yes, no, n.a.)	Code Section	Component	Information required	Location on Plans	Building Departments Notes	
MANDATORY PROVISIONS (section 4.2)						
		4.2.1	Fenestration rating			
		4.2.1.1	U-factor	Specify whether per 4.2.1.1 or default in Appendix C		
		4.2.1.1	SHGC	Specify whether per 4.2.1.2 or default in Appendix C		
		4.2.1.1	Air Leakage	Specify leakage rates		
		4.2.2	Opaque U-factors	Specify whether per default in Appendix C or ASHRAE		
		4.2.3	Bldg. envelop sealing	Indicate sealing, caulking, gasketing, and weather stripping		
PRESCRIPTIVE COMPLIANCE OPTION (section 4.3)						
		4.3.1	Roofs	Indicate R-values on roof sections		
		4.3.2	Cool roof	Indicate minimum reflectance and emittance on plans		
		4.3.3	Roof	Indicate R-values on wall sections		
		4.3.4	Vertical fenestration	1) Indicate U-factors on fenestration schedule. Indicate if values are rated or default. If values are default, then specify frame type, glazing layers, gap-width, low-e 2) Indicate SHGC or SC on fenestration schedule. Indicate if values are rated or default 3) Indicate if overhangs or side fins are used for compliance purposes. If so, provide projection factor calculation.		
		4.3.5	Skylights	1) Indicate U-factors on fenestration schedule. Indicate if values are rated or default. If values are default, then specify frame type, glazing layers, gap-width, low-e 2) Indicate SHGC or SC on fenestration schedule. Indicate if values are rated or default		
BUILDING ENVELOPE TRADE-OFF OPTION (section 4.4)						
				Provide Calculations		

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Form 4 - Mechanical Summary

Mechanical Summary

The Punjab Energy Conservation Code Compliance Forms

Project Info	Project Address:		Date
			For Building Department Use
	Applicant Name:		
	Applicant Address:		
	Applicant Phone:		
Project Description Briefly describe mechanical system type and features. <input type="checkbox"/> Includes Plans			
Compliance option	<input type="checkbox"/> Simple	<input type="checkbox"/> Prescriptive	<input type="checkbox"/> Whole Building
Equipment Schedules	The following information is required to be incorporated with the mechanical equipment schedules on the plans. For projects without plans, fill in the required information below		

Cooling Equipment Schedule

Equipment ID	Brand Name	Model No	Capacity kW	Total L/s	OSA CFM or Econo?	SEER or EER	IPLV	Location

Heating Equipment Schedule

Equipment ID	Brand Name	Model No	Capacity kW	Total L/s	OSA CFM or Econo?	SEER or EER	IPLV	Location

Fan Equipment Schedule

Equipment ID	Brand Name	Model No	Capacity kW	Total L/s	OSA CFM or Econo	SEER or EER	IPLV	Location

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Form 5 - Mechanical Permit Checklist

Mechanical Permit Checklist The Punjab Energy Conservation Code Compliance Forms	Mechanical Checklist
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Project Address			Date			
The following information is necessary to check a building permit application for compliance with the mechanical requirements in The Punjab Energy Conservation Building Code.						
Applicability (yes, no, n.a.)	Code Section	Component	Information required	Location on Plans	Building Dept. Notes	
HEATING, VENTILATION, AND AIR CONDITION (Chapter 5)						
MANDATORY PROVISIONS (Section 5.2)						
		5.2.2	Equipment efficiency	Provide equipment schedule with type, capacity, efficiency		
		5.2.4	Controls			
		5.2.4.1	Time clocks	Indicate thermostat with night setback, 3 different day types and 2-hour manual override		
		5.2.4.2	Temp. & dead band	Indicate temperature control with 3°C dead band minimum		
		5.2.4.3	Clg. tower, fluid cooler	Indicate two-speed motor, pony motor, or variable speed drive to control the fans		
		5.2.5.1	Piping & ductwork	Indicate sealing, caulking, gasketing, and weather stripping		
		5.2.5.1	Piping insulation	Indicate R-value of insulation		
		5.2.5.1	Ductwork insulation	Indicate R-value of insulation		
		5.2.5.1	Ductwork sealing	Specify sealing types and locations		
		5.2.6	System balancing	Specify system balancing		
PRESCRIPTIVE COMPLIANCE OPTION (Section 5.3)						
		5.3		Indicate whether project is complying with Punjab ECBC Prescriptive Option OR with ASHRAE Standard 90.1-2004		
		5.3.1	Economizer			
		5.3.1.1	Air economizer	Indicate 100% capability on schedule		
		5.3.1.2	Integrated operation	Indicate capability for partial cooling		
		5.3.1.3	Field testing	Specify tests		
		5.3.2	Variable flow hydronic			
		5.3.2.1	Pump flow rates	Indicate variable flow capacity on schedules		
		5.3.2.2	Isolation valves	Indicate two-way automatic isolation valves		
		5.3.2.3	Variable speed drive	Indicate variable speed drive		
SERVICE WATER HEATING AND PUMPING (Chapter 6)						
		6.2.1	Solar Water Heating	provide calculations to justify capacity to meet 20% threshold		
		6.2.2	Equipment efficiency	Provide equipment schedule with type, capacity, efficiency		
		6.2.4	Piping insulation	Indicate R-value of insulation		

		6.2.5	Heat traps	Indicate heat trap on drawings or provide manufacturers specifications to show that equipment has internal heat trap		
		6.2.6	Pool covers	Provide vapor retardant cover for pools		
		6.2.6	Pool over 32° C	Provide R-2.1 insulation		

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Form 6 - Lighting Summary

Lighting Summary
The Punjab Energy Conservation Code Compliance Forms

Project Info	Project Address			Date	
				For Building Department Use	
	Applicant Name:				
	Applicant Address:				
Applicant Phone:					
Project Description	<input type="checkbox"/> New Building	<input type="checkbox"/> Addition	<input type="checkbox"/> Alteration	<input type="checkbox"/> Change of Use	
Compliance option	<input type="checkbox"/> Prescriptive		<input type="checkbox"/> System Analysis		
Alteration Exceptions (check box, if appropriate)	<input type="checkbox"/> Less than 50% of the fixtures are new and installed lighting wattage is not being increased				
Maximum Allowed Lighting Wattage (Interior, section 7.3)					
Location (floor/room no.)	Occupancy description	Allowed Watt/m ²	Area in m ²	Allowed x area	
** Document all exceptions			Total allowed Watts		
Proposed Lighting Wattage (Interior)					
Location (floor/room no.)	Fixture Description	Number of Fixtures	Watts/fixture	Watts Proposed	
Total Proposed Watts may not exceed Total Allowed Watts for Interior			Total Proposed Watts		
Maximum Allowed Lighting Wattage (Exterior, Section 7.4)					
Location	Description	Allowed Watts/m ²	Area in m ² (or lm for perimeter)	Allowed watts x m ² (or x lm)	
			Total Allowed Watts		
Proposed Lighting Wattage (Exterior)					
Location	Fixture Description	Number of fixtures	Watts /fixture	Watts proposed	

Total Proposed Watts may not exceed Total Allowed Watts for Interior Proposed Watts			Total	

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Form 7 - Lighting Permit Checklist

Lighting Permit Checklist The Punjab Energy Conservation Code Compliance Forms	Lighting Checklist
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Project Address			Date			
The following information is necessary to check a building permit application for compliance with the lighting requirements in The Punjab Energy Conservation Building Code.						
Applicability (yes, no, n.a.)	Code section	Component	Information required		Location on Plans	Building Dept. Notes
LIGHTING (Chapter 7)						
MANDATORY PROVISIONS (Section 7.2)						
		7.2.1	Lighting Controls			
		7.2.1.1	Automatic shut off	Indicate automatic shutoff locations or occupancy sensors		
		7.2.1.2	Space Control	Provide schedule with type, indicate locations		
		7.2.1.3	Daylight Zones	Provide schedule with type and features, indicate locations		
		7.2.1.4	Ext. Lighting Control	Indicate photo sensor or astronomical time switch		
		7.2.1.5	Additional Controls	Provide schedule with type, indicate locations		
		7.2.2	Signage/ Advertisizing signage	Indicate 5 watts maximum		
		7.2.3	Exterior building grounds lighting	Indicate minimum efficacy of 60 lumens/Watt		
PRESCRIPTIVE INTERIOR LIGHTING POWER COMPLIANCE OPTION (Section 7.3)						
		7.3		Indicate whether project is complying with the Building Area Method (7.3.1) or the Space Function Method (7.3.2)		
		7.3.2	Building Area Method	Provide lighting schedule with wattage of lamp and ballast and number of fixtures. Document all exceptions		
		7.3.3	Space function method	Provide lighting schedule with wattage of lamp and ballast and number of fixtures. Document all exceptions		
		7.3.4.1	Luminarie Wattage	Indicate on plans		
PRESCRIPTIVE EXTERIOR LIGHTING POWER COMPLIANCE OPTIONS (Section 7.3.5)						
		7.3.5	Exterior Lighting Power	Provide lighting schedule with wattage of lamp and ballast and number of fixtures. Document all exceptions.		
ELECTRICAL POWER (Chapter 8)						
MANDATORY PROVISIONS (Section 8.2)						
		8.2.1	Transformers	Provide schedule with transformers losses		
		8.2.2	Motor efficiency	Provide equipment schedule with motor capacity efficiency		
		8.2.3	Power factor correction	Provide schedule with power factor correction		
		8.2.4	Check metering	Provide check metering and monitoring		

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Form 8 - Whole Building Performance Method Compliance Report

Project Name		Date	
Project Address		Telephone	
Designer of record			
Contact Person			
City:			
Weather Data:			
Climatic Zone:			
Total Conditioned Area(sqft)	Total Unconditioned Area(sqft)		Total Floor Area (sqft)
Advisory Message			
		Proposed Design	Standard Design
			Difference
Number of hours of heating loads unmet(system /plant)			
Number of hours of cooling loads (system/plant)			
Number of warnings			
Number of errors			
Number of defaults			
Additional building Information			
Number of floors			
Simulation program			
Comparison of Input Parameters in proposed design and standard design			
Building element	Proposed Design Input	Standard design Input	
Envelop			
Above Grade Wall construction(s)			
Below grade construction			
Roof construction			
Exterior Floor construction			
Slab-on-grade construction			
Window to gross wall ratio			
Fenestration types(s)			
Fenestration Assembly U-factor			
Fenestration Assembly SHGC			
Fenestration Visual light transmittance			
Fixed Shading devices			
Automated movable shading devices			
Electrical system & process loads			
Ambient light power density and lighting design description			
Process lighting			
Lighting occupant sensor controls			
Day lighting controls			
Receptacle equipment			

Elevators or escalators		
Re-refrigeration equipment		
Other process loads		
Mechanical and plumbing systems		
HVAC systems	Variable air volume	Constant air volume
Design supply air temperature differential		
Fan Control		
Fan Power		
Economizer Control		
Demand control ventilation		
Unitary Equipment cooling efficiency		
Unitary Equipment heating efficiency		
Chiller type, capacity and efficiency		
Cooling tower		
Boiler efficiency		
Chilled water loop and Pump parameters		
Condenser water loop and Pump parameters		
Hot water loop and pump parameters		
Domestic Hot Water pump parameters		

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Form 9 – End Use Summary

Standard design – End Use Summary											
End Use		0° rotation		90° rotation		180° rotation		270° rotation		Average	
	Energy type	Energy (KwH)	Peak (kW)	Energy (KwH)	Peak (kW)	Energy (KwH)	Peak (kW)	Energy (KwH)	Peak (kW)	Energy (KwH)	Peak (kW)
Interior lighting	Elec										
Interior Lighting (process)	Elec										
Exterior lighting	Elec										
Space Heating (Fuel 1)	Natural gas										
Space Heating (Fuel 2)	Elec										
Space cooling	Elec										
Pumps	Elec										
Heat rejection	Elec										
Fans Interior	Elec										
Fans Parking Garage	Elec										
Service Water Heating (Fuel 1)	Natural gas										
Service Water Heating (Fuel 2)	Elec										
Receptacle Equipment	Elec										
Refrigeration (Food, etc.)	Elec										
Cooking commercial, (Fuel 1)	Elec										
Cooking commercial, (Fuel 2)	Elec										
Elevators and escalators	Elec										
Other process	Elec										
Total building consumption / demand	Elec										
Total process energy	Elec										

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Form 10 – Energy Summary by End Use

Energy Summary by End Use						
	Proposed Design			Standard Design		
	Energy Type	Energy (kWh)	Peak (kW)	Energy (kWh)	Peak (kW)	Energy (%)
Interior Light (Ambient)	Elec.					
Interior Lighting (Process)	Elec.					
Exterior Lighting	Elec.					
Space Heating (Fuel 1)	Natural gas					
Space Heating (Fuel 2)	Elec.					
Space cooling	Elec.					
Pumps	Elec.					
Heat Rejection	Elec.					
Fans-Interior	Elec.					
Fans-Parking Garage	Elec.					
Service Water Heating (Fuel 1)	Natural gas					
Service Water Heating (Fuel 2)	Elec.					
Receptacle equipment	Elec.					
Refrigeration (food, etc.)	Elec.					
Cooking (commercial, Fuel 1)	Natural gas					
Cooking (commercial, Fuel 2)	Elec.					
Elevators and escalators	Elec.					
Other process	Elec.					
Total building consumption						

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Form 11

PROJECT DATA REQUIREMENT SHEET

Following are the documents required for meeting the requirements of Project ECBC Compliance: -

I - BUILDING ENVELOPE

Section 4 Compliance Forms with:-

1. DRAWINGS

- Floor wise area statement
- Site Plan/Master Plan
- Floor Plans
- All Side Elevations
- Door-Window Schedule
- Section Drawings
- Façade Wall and Roof Sections with material description and K-Value Marking

2. CALCULATIONS

- Window to Wall Ratio Calculation and Skylight to Roof Ration Calculation.
- U-Value Calculation for Wall and Roof.
- M Factor Calculation for Overhangs/Fins (if used).
- Tradeoff method calculation (if opted).

3. DATA SHEETS

- Insulation proposed to be used in Wall and Roof with its K-Value
- Proposed Window/Skylight Glass (Mentioning U Value, SHGC, VLT)
- Proposed Roof Tile/Paint (Mentioning SRI Value).

II – HVAC

Section 5 Compliance Forms with:-

4. DRAWINGS

- HVAC Layout showing air-conditioned area and non-air-conditioned area.
- Summary on provision done as per NBC 2005 Part 8, Section 1 for natural ventilation spaces.
- Proposed HVAC system details (Mechanical Schedules) with mentioning star rating and COP.

5. CALCULATIONS

- Air Side System and Hydronic System Balancing Report.

6. DATA SHEETS

- HVAC systems mentioning star rating or COP with IS standard.
- Proposed ceiling fans star rating
- Air circulator proposed in Air Conditioned room.
- Door Closer
- Piping Insulation (Mentioning the R value)
- Duct Insulation (Mentioning the R value)
- Pump used at cooling tower and closed circuit (Mentioning the efficiency and VFD specs)
- Photographs of shaded Condenser Unit.

III – SERVICE HOT WATER

Section 6 Compliance Forms with:-

7. DRAWINGS

- Plumbing layouts showing hot water supply (Solar/Electric/Fuel) to the toilets.

8. CALCULATIONS

- Hot water requirement in building and solar hot water provision (min 20%) calculation.

9. DATA SHEETS

- Solar Water Heater with the information of its efficiency.
- Electric equipment with the information of its efficiency
- Liquid/Gas fuel based equipment with the information of its efficiency.
- Insulation used for piping mentioning the R value.
- Swimming Pool Cover insulation mentioning the R value.

Form 14

IV – LIGHTING & ELECTRICAL SYSTEM

Section 7 Compliance Forms with:-

10. DRAWINGS

- Lighting drawings, showing the provision of occupancy sensors in the applicable spaces.
- Lighting layout showing the location of lighting fixtures, mentioning the type and wattage of the fixtures.

11. CALCULATIONS

- Lighting Power Density Calculation for interior spaces and exterior spaces.

12. DATA SHEETS

- Exterior Lighting fixtures/Street Lights in the campus with its specification (Time based or a photo sensed based).
- Interior lighting fixture with its type and wattage details.
- Display/Demonstrating/Exit Sign lighting fixture with its wattage details.
- Exterior Ground Lighting Fixtures with the information of its luminous efficacy (lm/W).
- Master control devices for hotel buildings.
- Task lighting fixtures.

Section 8 Compliance Forms with:-

13. DRAWINGS

- Transformer details with the information of its type, capacity and losses at 50% and 100% loading.
- Motors with the information of its class and efficiency.
- Power Factor or APFC (Automatic Power Factor Controller) with the specification.
- Meter details having the provision to display the kVA, kWh, PF, current, voltage, THD.
- Power cable specifications (Max 1% losses).